

CLAIMS

1. Photo-sensitive element for electro-optical sensors, comprising at least a photo-sensitive reception means (11), a current conversion circuit to convert the current  
5 generated by said photo-sensitive reception means (11) into a tension signal, and an amplification and reading circuit, characterized in that said current conversion circuit comprises at least a P-channel transistor (21) able to be used as an ideal key and to be piloted with a  
10 tension which is variable between a high feed tension and a low feed tension, said photo-sensitive element being able to be taken to a reset state if the pilot tension of said transistor (21) is low, and to an integration state if said pilot tension is high.
- 15 2. Photo-sensitive element as in claim 1, characterized in that said current conversion circuit comprises at least two transistors (21, 22), a first P-channel transistor (21) and a second N-channel transistor (22), said transistors (21, 22) having the respective source or drain  
20 terminals in common and the gate terminals able to be piloted externally by means of a tension of a variable value in order to selectively allow a linear conversion or a logarithmic conversion of said current photo-generated by said reception means (11).
- 25 3. Photo-sensitive element as in claim 1 or 2, characterized in that said transistors (21, 22) are of the CMOS type and are able to represent respectively an ideal key (21) and an active load (22).
4. Photo-sensitive element as in any claim hereinbefore,  
30 characterized in that the number of N-type transistors is variable from 1 to 12, in order to increase by a corresponding value the logarithmic conversion gain of said current photo-generated by said photo-sensitive

reception means (11).

5. Photo-sensitive element as in any claim hereinbefore, characterized in that said amplification and reading circuit comprises at least a third transistor (23) suitable to make a first amplification of the signal and a fourth transistor (24) to connect the photo-sensitive element (10) to a signal transmission line (28).

6. Photo-sensitive element as in claim 5, characterized in that said photo-sensitive reception means (11) consists of an inversely polarized N-type diode, the second (22), the third (23) and the fourth (24) transistor are of the N-channel type and the first transistor (21) is of the P-channel type.

7. Photo-sensitive element as in any claim from 1 to 5 inclusive, characterized in that said photo-sensitive reception means (11) consists of an inversely polarized P-type diode, the second (22), the third (23) and the fourth (24) transistors are of the P-channel type and the first transistor (21) is of the N-channel type.

8. Photo-sensitive element as in claim 5, characterized in that said fourth transistor (24) is able to be selectively enabled to allow the signal relating to the photo-sensitive element (10) selected to be read at any moment whatsoever.

9. Photo-sensitive element as in any claim hereinbefore, characterized in that it is able to detect the light of a wavelength of between 400 and 1000 nm and an intensity varying in an interval of at least 6 decades, between  $10^{-5}$  and  $10^3$  W/m<sup>2</sup>.

10. Photo-sensitive element as in any claim hereinbefore, characterized in that said photo-sensitive reception means (11) is made of an N-type diode, consisting of the joint between an insulated N-type diffusion and a P-type silicon

substrate, able to define an interface area emptied of free loads and characterized by the presence of an internal electric field.

11. Photo-sensitive element as in any claim from 1 to 9  
5 inclusive, characterized in that said photo-sensitive reception means (11) is made of a P-type diode, consisting of the joint between an insulated P-type diffusion all contained in an N-type diffusion, able to define an interface area emptied of free loads and characterized by  
10 the presence of an internal electric field.

12. Photo-sensitive element as in any claim hereinbefore, characterized in that it is able to be entirely integrated into a silicon substrate of limited size, to achieve a microchip.

15 13. Photo-sensitive element as in any claim hereinbefore, characterized in that it is able to constitute a cell of a linear or matrix multiple cell sensor.